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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,985	02/21/2002	Zhi-Cheng Lu	TS01-725	2255

28112 7590 09/23/2003

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EXAMINER

PERT, EVAN T

ART UNIT PAPER NUMBER

2829

DATE MAILED: 09/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/081,985

Applicant(s)

LU ET AL.

Examiner

Evan Pert

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 0402. 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Product (Claims 24-28)

Claims 24-28 recite product-by-process limitations that do not amount to significantly claimed *structure*. See *MPEP* 2113.

For purposes of examination, claims 24-25 and 27 are structurally equivalent to “a dielectric anti-reflection coating,” while claim 28 also specifies a particular “thickness” of the coating and claim 26 specifies a “material type” for the coating.

Method (Claims 1-23)

Claims 1-23 recite a step a) of depositing “a dielectric,” a step b) of exposing “the dielectric” and a last step of “repeating steps a) and b).” The repeating step, then, by antecedent basis in the claims, refers to depositing and exposing the same type of layer with the same exposure. Yet, the claims recite that layers that make up the final layer are of “different composition,” which leads to confusion:

Is the final layer thickness made up of sub-layers of the same type of material having differing atomic ratios? Can any dielectric material of any type be used for each sub-layer deposited by step a), or is each layer the same material such as "oxynitride or oxycarbide"? For purposes of examination, the sub-layers may be of totally different composition.

Claims 8-15 and 23 recite "simulating" to determine a "surface treatment." Yet, it is unclear how simulating is performed to select a "surface treatment." Known software simulations, such as PROLITH (U.S. 6,459,401, col. 4, line 27) can be used to simulate optical properties of multi-layer coatings based on composition and material thickness, yet applicant claims "simulating" to determine "a surface treatment." What is the scope of "surface treatment" contemplated? Plasma is the only treatment disclosed, but how is this treatment determined by "simulating"?

In claim 10, if the surface treatment "further comprises" plasma treatment, what is the treatment in the independent claim 8?

Claims 1-7, 10 and 16-23 recite "exposing the layer to a plasma," but it is unclear that the "exposing to a plasma" is not the plasma used in a PECVD deposition of the layer (where the layer is exposed to the plasma the whole time it is formed), but rather is a distinct and separate plasma treatment of the surface of a layer completely deposited in a step a).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 24-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al. (U.S. 6,037,276), as an example.

Applicant has failed to adequately characterize the structure of an inventive dielectric anti-reflection coating suitable for clearly distinguishing from the prior art.

See MPEP 2113 and rejection under 35 USC 112 above.

Lin et al. Teach an anti-reflection coating (i.e. a BARC layer 10-14) wherein the BARC layer is comprised of two sub-layers of oxynitride 10 (150 to 1000 angstroms thick) and nitride 14 (1000 to 3000 angstroms thick).

Regarding the recited “plasma” limitations, the examiner does not give significant patentable weight since the structure being claimed is not a “plasma”. The plasma is gone when the layer is a product.

Regarding the contiguous layers recited in claim 27, there are two in the BARC disclosed by Lin et al..

If applicant establishes a clear and examinable structural significance of the claimed coating by way of its “plasma treatment,” the examiner will be able to search for that coating properly.

Allowable Subject Matter

3. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose methodology for achieving a desired index of refraction and extinction coefficient of a multi-layer anti-reflection coating wherein surface plasma treatment of completed sub-layers is performed as part of the tailoring of optical properties of the coating made up of the individual sub-layers.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. 6,376,392 is cited for teaching the use of plasma enhanced CVD to make anti-reflection coatings. U.S. 6,242,361 is cited for teaching a surface plasma treatment of an anti-reflection coating to remove amino groups adsorbed on the surface that interfere with photoresist patterning. U.S. 6,479,401 is cited for disclosing simulation software suitable for simulating optical properties based on material type and geometry, but does not teach surface treatment simulation.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 703-306-5689. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on 703-308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.

ETP

September 8, 2003

A handwritten signature in black ink, appearing to read 'Evan Pert', with a long horizontal stroke extending to the right.

**EVAN PERT
PRIMARY EXAMINER**